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10/751,562	01/05/2004	Hae-Seung Lee	16820.P345	2404

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EXAMINER	
CHEN, CHIA WEI A	

ART UNIT	PAPER NUMBER
2622	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	10/751,562	LEE ET AL.	
	Examiner	Art Unit	
	Chia-Wei A. Chen	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24,26 and 28-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24,26 and 28-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is in response to the amendment dated 11/07/2007 in application 10/751562.

Response to Arguments

2. Applicant's arguments filed 11/07/2007 have been fully considered but they are not persuasive.

Applicant argues with respect to claims 1, 11, 16, 21, 24, and 31 that Kindt et al. does not disclose that the intra-period reset pulses progressively decrease in pulse width. However, see the objection to the Specification below. The limitation is, as best understood by the examiner, to read "... the intra-period reset pulses progressively decreasing in pulse voltage..." Kindt et al. clearly teaches this limitation in Figures 2 and 3 and in col. 12, lines 54-56 and col. 15, lines 18-50.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: In claims 1, 11, 16, 21, 24, 31 the limitation "the intra-period reset pulses progressively decreasing in pulse width…"

Therefore, the limitation is, as best understood by the examiner, to read "... the intra-period reset pulses progressively decreasing in pulse voltage..."

Claim Rejections - 35 USC § 102

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 11-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Kindt et al. (US 6,348,681 B1).

As to claim 11, Kindt et al. teaches, in Figure 5, a method for measuring a sense node voltage associated with a light detecting element (d1), the sense node voltage being related to light intensity incident upon the light detecting element, comprising:

- (a) initiating an integration period for the light-detecting element (col. 9, lines 33-35);
- (b) resetting, using a plurality of intra-period reset pulses, a plurality of times, the voltage level of the sense node after initiating the integration period, the intra-period reset pulses progressively decreasing in pulse width (col. 8, lines 39-43, col. 15, lines 19-50; voltages Ux1, Ux2, Ux3; col. 12, lines 54-56, col. 15, lines 18-50); and
- (c) measuring, only once during the integration period, the sense node voltage generated in response to incident light intensity, the sense node voltage being measured subsequent to the plural resettings of the voltage level of the sense node and prior to initiating a next integration period (col. 6, lines 29-34, col. 11, lines 62-64).

As to claim 12, Kindt et al. teaches the method as claimed in claim 11, wherein the voltage levels associated with the plural resettings of the voltage level of the sense

node have voltage values less than a voltage value used to reset the voltage level of the sense node at a beginning of the integration period (col. 12, lines 54-56).

As to claim 13, Kindt et al. teaches the method as claimed in claim 11, wherein a voltage level associated with one of the plural resettings during the integration period is less than a voltage level associated with a previous one of the plural resettings during the integration period (col. 13, lines 45-50, eqs. 32 and 34).

As to claims 14 and 15, Kindt et al. teaches the method as claimed in claim 11, wherein the plural resettings generate a non-periodic pattern (col. 13, lines 41-46) and wherein the plural resettings generate a periodic pattern (col. 13, lines 41-46). (The timings of XDR reset pulses are user designed and programmable. Tx1, Tx2, and Tx3 may be programmed and calculated according to equations 28-34. The user can decide to make the pulses either periodic or non-periodic.)

As to claim 16, Kindt et al. teaches, in Figure 5, a method for capturing a frame of image data associated with a scene using an array of light-detecting elements, each light-detecting element having an associated sense node (col. 7, lines 64-65), comprising:

- (a) initiating an integration period for the array of light-detecting elements, the integration period being associated with the frame of image data (col. 9, lines 33-35);
- (b) generating a plurality of intra-period reset pulses during the integration period such that voltage levels of the sense nodes associated with a portion of the array of

light-detecting elements are enabled to be set a plurality of times during the integration period, the intra-period reset pulses progressively decreasing in pulse width (col. 8, lines 39-43, col. 15, lines 19-50; voltages Ux1, Ux2, Ux3; col. 12, lines 54-56, col. 15, lines 18-50); and

- (c) measuring, only once during the integration period, the voltage levels of the sense nodes voltages generated in response to incident light intensities, the sense node voltages being measured subsequent to a final resetting of the voltage levels of the sense nodes associated with the portion of the array of light-detecting elements and prior to initiating a next integration period (col. 11, lines 62-64, col. 6, lines 29-34).

As to claim 17, Kindt et al. teaches the method as claimed in claim 16, wherein the voltage levels associated with the plurality of intra-period reset pulses have voltage values less than a voltage value used to reset the voltage levels of all the sense nodes at a beginning of the integration period (col. 12, lines 54-56 and eqs. 28-34).

As to claim 18, Kindt et al. teaches the method as claimed in claim 16, wherein a voltage level associated with the plurality of intra-period reset pulses during the integration period is less than a voltage level associated with a previous one of the plurality of reset pulses during the integration period (col. 15, lines 45-50 and eqs. 28-34).

As to claim 19, Kindt et al. teaches the method as claimed in claim 16, wherein the voltages levels associated with the plurality of intra-period reset pulses during the integration period progressively decrease during the integration period (col. 15, lines 45-50 and eqs. 28-34).

As to claim 20, Kindt et al. teaches the method as claimed in claim 16, further comprising: (d) resetting a voltage level of the sense node when the voltage level of the sense node is less than the voltage value associated with the generated reset pulse (Fig. 3, col. 4, lines 13-17, col. 13, lines 15-20).

As to claim 21, Kindt et al. teaches, in Figure 5, a method for measuring a sense node voltage associated with a light detecting element (d1), the sense node voltage being related to light intensity incident upon the light detecting element, comprising:

- (a) initiating an integration period for the light-detecting element (col. 9, lines 33-35);
- (b) resetting, a first number of times during the integration period, using a number of intra-period reset pulses, the number of intra-period reset pulses being equal to the first number of times, the voltage level of the sense node after initiating the integration period, the intra-period reset pulses progressively decreasing in pulse width (col. 8, lines 39-43, col. 15, lines 19-50; voltages Ux1, Ux2, Ux3; col. 12, lines 54-56, col. 15, lines 18-50); and
- (c) measuring the sense node voltage generated in response to incident light intensity, the sense node voltage being measured a second number of times during

the integration period, the second number of times being less than the first number of times (col. 6, lines 29-34, col. 11, lines 62-64).

As to claim 22, Kindt et al. teaches the method as claimed in claim 21, wherein the voltage level associated with resetting of the voltage level of the sense node has a voltage value less than a voltage value used to reset the voltage level of the sense node at a beginning of the integration period (col. 12, lines 54-56).

As to claim 23, Kindt et al. teaches the method as claimed in claim 21, wherein the first number of times is greater than one and wherein a voltage level associated with one of the plural resettings during the integration period is less than a voltage level associated with a previous one of the plural resettings during the integration period (col. 10, lines 10-12, col. 15, lines 45-50, eqs. 32 and 34).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-10, 24, 26 and 28-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kindt et al. (US 6,348,681 B1).

As to claim 1, Kindt et al. discloses, in Figure 5, a method for measuring a sense node voltage associated with a light-detecting element (d1), the sense node voltage being related to light intensity incident upon the light-detecting element:

- (a) generating a first integration reset pulse to enable a resetting of the sense node voltage to a voltage value substantially equal to a reset voltage value associated with the first integration reset pulse, an edge of the first integration reset pulse triggering a beginning of a first integration period (col. 9, lines 33-35);
- (c) generating, subsequent to the generation of the first integration reset pulse and prior to the generation of the second integration reset pulse, a plurality of intra-period reset pulses (XDR reset pulses) to enable resetting of the sense node voltage to a plurality of voltage values, each voltage value being substantially equal to a reset voltage value associated with the generated intra-period reset pulse, the intra-period reset pulses progressively decreasing in pulse width (col. 8, lines 39-43, col. 15, lines 19-50; voltages Ux1, Ux2, Ux3; col. 12, lines 54-56, col. 15, lines 18-50); and
- (d) measuring, only once during an integration period, the sense node voltage generated in response to incident light intensity, the sense node voltage being measured subsequent to the generation of the plurality of intra-period reset pulses and prior to the generation of the second integration reset pulse (col. 11, lines 62-64, col. 6, lines 29-34);

but does not specifically teach:

- (b) generating a second integration reset pulse to enable a resetting of the sense node voltage to a voltage value substantially equal to a reset voltage value

associated with the second integration reset pulse, an edge of the second integration reset pulse triggering a beginning of a second integration period;

The Description of the Related Art of the same document, Kindt et al., specifically teaches:

- (b) generating a second integration reset pulse to enable a resetting of the sense node voltage to a voltage value substantially equal to a reset voltage value associated with the second integration reset pulse, an edge of the second integration reset pulse triggering a beginning of a second integration period (col. 3, lines 10-14);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the second integration reset pulse in the Description of the Related Art of Kindt et al. with the intra-period reset pulses taught in the body of the invention of Kindt et al. to allow implementation of the Extended Dynamic Range (XDR) technique using simpler circuitry using only a single set of CDS circuits and to not require circuitry for combining the outputs of two sets of CDS circuits (see col. 6, lines 29-34 of Kindt et al.).

As to claim 2, Kindt et al. teaches the method as claimed in claim 1, wherein the reset voltage values associated with the plurality of intra-period reset pulses are less than the reset voltage value associated with the first integration reset pulse (voltages Ux1, Ux2, Ux3; col. 12, lines 54-56, col. 15, lines 18-50).

As to claim 3, Kindt et al. teaches the method as claimed in claim 2, wherein the reset voltage value associated with one of the plurality of intra-period reset pulses is less than the reset voltage value associated with a previous one of the plurality of intra-period reset pulses (voltages Ux1 and Ux2, col. 10, lines 10-12, col. 15, lines 45-50, eqs. 32 and 34)

As to claims 4-9, Kindt et al. teaches the methods as claimed in claims 1-3, wherein the generation of the plurality of intra-period reset pulses is non-periodic (col. 13, lines 41-46) and wherein the generation of the plurality of intra-period pulses is periodic (col. 13, lines 41-46). (The timings of XDR reset pulses are user designed and programmable. Tx1, Tx2, and Tx3 may be programmed and calculated according to equations 28-34. The user can decide to make the pulses either periodic or non-periodic.)

As to claim 10, Kindt et al. teaches the method as claimed in claim 1, further comprising: (e) resetting a voltage level of the sense node when the voltage level of the sense node is less than the voltage value associated with the generated intra-period reset pulse (col. 13, lines 15-20).

As to claim 24, Kindt et al. teaches a method for measuring a sense node voltage associated with a light-detecting element (d1), the sense node voltage being related to light intensity incident upon the light-detecting element, the light-detecting element

having a reset switch associated therewith so as to set a voltage level of the sense node (col. 2, lines 46-50), comprising:

- (a) generating a first integration reset pulse to enable a resetting of the sense node voltage to a voltage value substantially equal to a reset voltage value associated with the first integration reset pulse, an edge of the first integration reset pulse triggering a beginning of a first integration period (col. 9, lines 33-35);
- (c) generating, subsequent to the generation of the first integration reset pulse and prior to the generation of the second integration reset pulse, a train of progressively decreasing intra-period reset pulses to enable resetting of the sense node voltage to a plurality of voltage values, each voltage value being substantially equal to a reset voltage value associated with the generated intra-period reset pulse (col. 8, lines 39-43, col. 15, lines 19-50); and
- (d) measuring, only once during an integration period, the sense node voltage generated in response to incident light intensity, the sense node voltage being measured subsequent to the generation of the train of progressively decreasing intra-period reset pulses and prior to the generation of the second integration reset pulse, the train of progressively decreasing intra-period reset pulses progressively decreasing in pulse width (col. 11, lines 62-64, col. 6, lines 29-34; voltages Ux1, Ux2, Ux3; col. 12, lines 54-56, col. 15, lines 18-50);

but does not specifically teach:

- (b) generating a second integration reset pulse to enable a resetting of the sense node voltage to a voltage value substantially equal to a reset voltage value

associated with the second integration reset pulse, an edge of the second integration reset pulse triggering a beginning of a second integration period;

The Description of the Related Art of the same document, Kindt et al., specifically teaches:

- (b) generating a second integration reset pulse to enable a resetting of the sense node voltage to a voltage value substantially equal to a reset voltage value associated with the second integration reset pulse, an edge of the second integration reset pulse triggering a beginning of a second integration period (col. 3, lines 10-14);

As to claim 26, Kindt et al. teaches the methods as claimed in claims 24 and 25, wherein the train of progressively decreasing intra-period reset pulses progressively decreases in voltage level (col. 15, lines 45-50, eqs. 32, 34).

As to claims 28 and 29, Kindt et al. teaches the method as claimed in claim 24, wherein the train of progressively decreasing intra-period reset pulses represents a non-periodic pattern (col. 13, lines 41-46) and wherein the train of progressively decreasing intra-period reset pulses represents a periodic pattern (col. 13, lines 41-46). (The timings of XDR reset pulses are user designed and programmable. Tx1, Tx2, and Tx3 may be programmed and calculated according to equations 28-34. The user can decide to make the pulses either periodic or non-periodic.)

As to claim 30, Kindt et al. teaches the method as claimed in claim 24, further comprising: (e) resetting a voltage level of the sense node when the voltage level of the sense node is less than the voltage value associated with the generated intra-period reset pulse (Fig. 3, col. 4, lines 13-17, col. 13, lines 15-20).

As to claims 31-40, these claims differ only in that the plurality of intra-period reset pulses selectively reset (col. 13, lines 15-20) the sense node voltage to a plurality of voltage values. Thus, claims 31-40 are analyzed as previously discussed in claims 1-10.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chia-Wei A. Chen whose telephone number is 571-270-1707. The examiner can normally be reached on Monday - Friday, 7:30 - 17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NgocYen Vu can be reached on (571) 272-7320. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

cac
1/16/08

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